Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for identifying fissile material within an interrogated vessel, comprising:

casting an incident photon beam from an electron beam accelerator through the interrogated vessel on the fissile material;

detecting an emerging photon beam within an energy range from about 1 MeV to about 50 MeV from the fissile material with an array of fission-fragment detectors, a first set of scintillator paddles, and a second set of scintillator paddles, wherein the array of fission-fragment detectors, the first set of scintillator paddles, and the second set of scintillator paddles (a) are arranged sequentially in a direct path of the emerging photon beam such that each receives the emerging photon beam, and (b) are sensitive to different ranges of photon beam energy;

obtaining a first signal from the array of fission-fragment detectors, a second signal from the first set of scintillator paddles, and a third signal from the second set of scintillator paddles, each signal indicative of photon yield within the different ranges of photon beam energy; and

determining a photon energy regime of the emerging photon beam through identification of a drop in photon yield in at least one of the three signals, the determined photon energy regime identifying the fissile material within the interrogated vessel.

2. (Previously Presented) The method of claim 1, wherein said identifying comprises determining a range of an atomic number of a material in a container.

3. (Previously Presented) The method of claim 1, wherein detecting the emerging photon beam from the material with the array of fission-fragment detectors comprises detecting an energy range of the emerging photon beam in a range between about 10 MeV to 20 MeV.

4. (Withdrawn) The method of claim 1, wherein detecting the emerging photon beam with the array of fission-fragment detectors comprises detecting the emerging photon beam with a tunable array of fission-fragment detectors.

5. (Withdrawn) The method of claim 4, wherein detecting the emerging photon beam with the tunable array of fission-fragment detectors includes using a target of atomic number substantially similar to the atomic number of the material.

6. (Previously Presented) The method of claim 1, wherein detecting the emerging photon beam from the material with the first set of scintillator paddles comprises detecting an energy range of the emerging photon beam in a range up to about 6 MeV.

7. (Previously Presented) The method of claim 1, wherein detecting the emerging photon beam from the material with the second set of scintillator paddles comprises detecting an energy range of the emerging photon beam exceeding about 6 MeV.

8. (Canceled)

9. (Previously Presented) The method of claim 1, further comprising creating a photon distribution energy curve using a combination of the first signal from the array of fission-fragment detectors, the second signal from the first set of scintillator paddles, and the third signal from the second set of scintillator paddles.

10. (Withdrawn) A photon beam flux monitor for resolving a high-energy beam, comprising:

an array of fission-fragment detectors for measuring a first range of photon energies;

a first set of scintillator paddles coupled to the array of fission-fragment detectors for measuring a second range of photon energies;

a convertor coupled to the first set of scintillator paddles; and

a second set of scintillator paddles coupled to the convertor for measuring a third range of photon energies.

11. (Withdrawn) The photon beam flux monitor of claim 10, wherein the first, second and third range of photon energies overlap.

12. (Withdrawn) The photon beam flux monitor of claim 10, wherein the first, second and third range of photon energies do not overlap.

13. (Withdrawn) The photon beam flux monitor of claim 10, wherein the array of fission-fragment detectors comprises an array of tunable fission-fragment detectors.

14. (Withdrawn) The photon beam flux monitor of claim 10, wherein the array of fission-fragment detectors is sensitive to a photon energy of about 10 to 20 MeV.

15. (Withdrawn) The photon beam flux monitor of claim 13, wherein the array of tunable fission-fragment detectors comprises a target.

16. (Withdrawn) The photon beam flux monitor of claim 14, wherein the target comprises a film of ^{238}U.

17. (Withdrawn) The photon beam flux monitor of claim 10, wherein the first set of scintillator paddles is sensitive to a photon energy in a range up to about 6 MeV.

18. (Withdrawn) The photon beam flux monitor of claim 10, further comprising a first set of photo-multiplier tubes coupled to the first set of scintillator paddles.

19. (Withdrawn) The photon beam flux monitor of claim 10, wherein the second set of scintillator paddles is sensitive to a photon energy exceeding about 6 MeV.

20. (Withdrawn) The photon beam flux monitor of claim 10, further comprising a second set of photo-multiplier tubes coupled to the second set of scintillator paddles.

21. (Withdrawn) The photon beam flux monitor of claim 10, wherein the convertor is a lead convertor.

22. (Withdrawn) The photon beam flux monitor of claim 10, wherein the convertor is operable to produce electron/positron pairs.

23. (Withdrawn) A photon interrogation system, comprising:

an electron beam generator;

a radiator coupled to the electron beam generator;

an electron stopping block coupled to the radiator; and

a photon beam flux monitor in operative relation with the electron stopping block, the photon beam flux monitor comprising:

an array of fission-fragment detectors;

a first set of scintillator paddles coupled to the array of fission-fragment detectors;

a convertor coupled to the first set of scintillator paddles; and

a second set of scintillator paddles coupled to the convertor.

24. (Withdrawn) The photon beam flux interrogation system of claim 23, further comprising a data acquisition and processing system coupled to the photon beam flux monitor.

25. (Withdrawn) The photon beam flux interrogation system of claim 23, wherein the array of fission-fragment detectors comprises an array of tunable fission-fragment detectors.

26. (Withdrawn) The photon beam flux interrogation system of claim 25, wherein the array of tunable fission-fragment detectors comprises a target.

27. (Withdrawn) The photon beam flux interrogation system of claim 26, wherein the target comprises a film of ^{238}U.

28. (Previously Presented) The method of claim 1, wherein casting an incident photon beam from the electron beam accelerator comprises directing an electron beam onto a radiator for producing a photon beam through bremsstrahlung process.

29. (Previously Presented) The method of claim 1, further comprising producing electron positron pairs with a convertor coupled to the second set of scintillator paddles.

30. (Previously Presented) The method of claim 29, further comprising detecting an energy range of the electron positron pairs exceeding about 6 MeV.

31. (Previously Presented) The method of claim 1, wherein the array of fission fragment detectors is sensitive to a range of photon beam energy between about 10 MeV and 20 MeV, the first set of scintillator paddles is sensitive to a range of photon beam energy up to about 6 MeV, and the second set of scintillator paddles is sensitive to a range of photon beam energy above about 6 MeV.

32. (Previously Presented) The method of claim 31, wherein the first and second set of scintillator paddles comprise plastic scintillator paddles.

33. (Previously Presented) The method of claim 1, wherein the array of fission fragment detectors, the first set of scintillator paddles, and the second set of scintillator paddles are sensitive to different, but overlapping ranges of photon beam energy.